

REMARKS

In response to the Office Action dated April 7, 2008, Applicants respectfully request reconsideration and withdrawal of the rejection of the claims.

Claims 11-47, 51-54 and 56-62 were rejected under 35 U.S.C. §251. The Office Action states that the independent claims within this identified group contain recapture issue on the grounds that they "fail to contain subject matter surrendered in the original application." For the reasons presented in Applicants' previous response, it is respectfully submitted that the rejected claims do not attempt to recapture subject matter that was "surrendered" in the original application. As pointed out the previous response, each of the pending independent claims is narrower in scope than the originally presented claims of Application No. 09/138,562. Accordingly, Applicants are not attempting to recapture the subject matter that was encompassed by those claims prior to the time that they were amended to place them in allowable form. See Ex parte Eggert, 67 USPQ2d 1716 (Bd. Pat. App. & Inter. 2003), which was discussed in Applicants' previous response.

The Office Action states that claim language similar to the phrase "wherein said level difference serves to avoid capillary flow of solder to prevent short-circuiting between the leads adjacent to each other" appears in every patented independent claim, and further states that this feature must be included in the reissue claims to remove the basis for the rejection. Accordingly, pursuant to the Examiner's suggestion, each of the independent reissue claims has been amended to include a "wherein" clause that corresponds to the language identified by the Examiner in the

Office Action.¹ It is respectfully submitted that the addition of this "wherein" clause does not result in a narrowing of the reissue claims, since each of them originally recited the structure of the level difference, and the "wherein" clause sets forth an inherent attribute function of this claimed structure, namely the avoidance of capillary flow between adjacent leads.

Since the independent reissue claims have been amended to incorporate the Examiner's suggestion for removing the sole basis for the rejection, it is respectfully submitted that the all pending claims in the application are in allowable form, and a notice to that effect is respectfully solicited.

Further, it is respectfully submitted that entry of the Amendment is appropriate. First, it places the application in condition for allowance. Second, the only amendments that are being made to the claims is to incorporate the language that was explicitly identified by the Examiner in the Office Action, and required to be included in each of the reissue claims. As such, the amendments to the claims do not represent any new issues beyond those that had been previously considered by the Examiner. Entry of the Amendment, and allowance of all pending claims, is respectfully requested.

Respectfully submitted,

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¹ For the convenience of the Examiner, a complete listing of all of the pending reissue claims, with markings to identify the changes being made to the independent claims, is attached to the end of this response.

MARK-UP TO SHOW CHANGES MADE

11. (Amended) A semiconductor element module, comprising:
a package;
a semiconductor element within said package;
a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion bent in an outward direction relative to the side surface of said package, said open end portion being downwardly protruded from a plane including a bottom surface of said package; and
a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another.

12. A semiconductor element module according to claim 11, further comprising a brazing material disposed within said level difference to secure the attachment of said leads to said package.

13. A semiconductor element module according to claim 12, wherein said brazing material is disposed at a location remote from the bottom surface of said package.

14. A semiconductor element module according to claim 11 wherein said leads extend along and are attached to a side surface of said package.

15. A semiconductor element module according to claim 11, wherein said semiconductor element is an optical element.

16. (Amended) A semiconductor device comprising a substrate and a semiconductor element module mounted on said substrate, said semiconductor element module including:

a package;
a semiconductor element within said package;
a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion bent in an outward direction relative to the side surface of said package, said open end portion being downwardly protruded from a plane including a bottom surface of said package; and
a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another.

17. A semiconductor device according to claim 16, wherein said substrate has a mounting surface and conductor patterns formed on said mounting surface, said semiconductor element module being mounted on said substrate by joining said open end portions of said leads to said conductor patterns.

18. A semiconductor device according to claim 16, further comprising a brazing material disposed within said level difference to secure the connection of said leads to said package.

19. A semiconductor device according to claim 16, wherein said semiconductor element is an optical element.

20. A semiconductor device according to claim 16, wherein said substrate has a mounting surface, said semiconductor element module being mounted on said substrate so that the bottom surface of said package is spaced from said mounting surface of said substrate by a prescribed distance.

21. (Amended) A semiconductor element module, comprising:
a package having an opening for allowing an optical signal to pass therethrough;

an optical element located in said package for outputting or inputting the optical signal;

a plurality of leads for connecting said optical element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion bent in an outward direction relative to the side surface of said package, said open end portion being downwardly protruded from a plane including a bottom surface of said package; and

a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another,

and wherein each of said leads [having] has an uppermost end which is lower than an uppermost end of said opening.

22. (Amended) A semiconductor element module, comprising;

a package having an inner bottom surface and an opening for allowing an optical signal to pass therethrough;

an optical element located in said package for outputting or inputting the optical signal;

a plurality of leads for connecting said optical element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion bent in an outward direction relative to the side surface of said package, said open end portion being downwardly protruded from a plane including a bottom surface of said package; and

a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another,

and wherein each of said leads [having] has an uppermost end which is lower than an uppermost end of said opening, said level difference having a surface which intersects the side surface of said package, and the surface of said level difference being higher than the inner bottom surface of said package.

23. A semiconductor element module according to claim 22, further comprising a brazing material disposed within said level difference to secure the attachment of said leads to said package.

24. (Amended) A semiconductor device comprising a substrate and a semiconductor element module mounted on said substrate,
said semiconductor element module including;
a package having an inner bottom surface and an opening for allowing an optical signal to pass therethrough;
an optical element located in said package for outputting or inputting the optical signal;
a plurality of leads for connecting said optical element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion bent in an outward direction relative to the side surface of said package, said open end portion being downwardly protruded from a plane including a bottom surface of said package; and
a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another,
and wherein each of said leads [having] has an uppermost end which is lower than an uppermost end of said opening, said level difference having a surface which intersects the side surface of said package, and the surface of said level difference being higher than the inner bottom surface of said package.

25. (Amended) A semiconductor element module, comprising;
a package having an opening for allowing an optical signal to pass therethrough;
an optical element located in said package for outputting or inputting the optical signal;

a mount having said optical element placed thereon for fixing said optical element to said package;

a plurality of leads for connecting said optical element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion bent in an outward direction relative to the side surface of said package, said open end portion being downwardly protruded from a plane including a bottom surface of said package; and

a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another,

and wherein each of said leads [having] has an uppermost end which is lower than an uppermost end of said opening, said level difference having a surface which intersects the side surface of said package, and the surface of said level difference being higher than a bottom surface of said mount.

26. A semiconductor element module according to claim 25, further comprising a brazing material disposed within said level difference to secure the attachment of said leads to said package.

27. (Amended) A semiconductor device comprising a substrate and a semiconductor element module mounted on said substrate,

said semiconductor element module including;

a package having an opening for allowing an optical signal to pass therethrough;

an optical element located in said package for outputting or inputting the optical signal;

a mount having said optical element placed thereon for fixing said optical element to said package;

a plurality of leads for connecting said optical element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion bent in an outward direction relative to

the side surface of said package, said open end portion being downwardly protruded from a plane including a bottom surface of said package; and

a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another,

and wherein each of said leads [having] has an uppermost end which is lower than an uppermost end of said opening, said level difference having a surface which intersects the side surface of said package, and the surface of said level difference being higher than a bottom surface of said mount.

28. (Amended) A semiconductor element module, comprising:

a package;

a semiconductor element within said package;

a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion having a tip which is downwardly protruded from a plane including a bottom surface of said package and which is oriented in an outward direction relative to said side surface of said package; and

a level difference at said side surface of the package adjacent to said bottom surface of the package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another.

29. A semiconductor element module according to claim 28, further comprising a brazing material disposed within said level difference to secure the attachment of said leads to said package.

30. A semiconductor element module according to claim 28, wherein said level difference has a surface which intersects the side surface of said package and which is substantially perpendicular to said side surface and a portion of the leads

which protrude downwardly therefrom, and further including a brazing material which is disposed between the surface of said level difference and the downwardly protruding portion of the leads to secure the attachment of said leads to said package.

31. A semiconductor element module according to claim 28, wherein each of said leads has an uppermost end, and a distance between the bottom surface of said package and the uppermost end of each of said leads is larger than the distance between the tip of the open end of each of said leads and the bottom surface of said package.

32. A semiconductor element module according to claim 28, wherein said level difference has a surface which intersects the side surface of said package, and a distance between the bottom surface of said package and the surface of said level difference is larger than the distance between the tip of the open end of each of said leads and the bottom surface of said package.

33. (Amended) A semiconductor element module, comprising:
a package;
a semiconductor element within said package;
a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion being downwardly protruded from a plane including a bottom surface of said package;
a level difference formed by a surface which intersects the side surface of said package adjacent to the bottom surface of said package and which is substantially perpendicular to said side surface and a portion of the leads which protrude downwardly therefrom so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another; and

a brazing material disposed between the surface of said level difference and the downwardly protruding portion of the leads to secure the attachment of said leads to said package.

34. A semiconductor element module according to claim 33, wherein said brazing material is disposed at a location remote from the bottom surface of said package.

35. (Amended) A semiconductor element module, comprising:
a package having an opening for allowing an optical signal to pass therethrough;

an optical element located in said package for outputting or inputting the optical signal;

a plurality of leads for connecting said optical element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion being downwardly protruded from a plane including a bottom surface of said package; and

a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another

each of said leads having an uppermost end which is lower than an uppermost end of said opening.

36. (Amended) A semiconductor element module, comprising:
a semiconductor element;
a package having walls that surround said semiconductor element;
a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion attached along the exterior surface of a side wall of said package and another open end portion being downwardly protruded from a plane including a bottom surface of said package;

a level difference that forms a recess away from the exterior surface of the side wall of said package adjacent to the bottom surface of said package, said recess having a width which is greater than the thickness of said side wall, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another; and

a brazing material disposed within said recess to secure the attachment of said leads to said package.

37. A semiconductor element module according to claim 36, wherein said brazing material is disposed at a location remote from the bottom surface of said package.

38. (Amended) A semiconductor element module, comprising;
a package having an inner bottom surface and an opening for allowing an optical signal to pass therethrough;
an optical element located in said package and supported by said inner bottom surface, for outputting or inputting the optical signal;
a plurality of leads for connecting said optical element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open portion being downwardly protruded from a plane including a bottom surface of said package; and

a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another,

and wherein each of said leads has an uppermost end which is lower than an uppermost end of said opening, said level difference having a surface which intersects the side surface of said package, and the surface of said level difference being higher than the inner bottom surface of said package.

39. A semiconductor element module according to claim 38, further comprising a brazing material disposed within said level difference to secure the attachment of said leads to said package.

40. (Amended) A semiconductor element module, comprising;
a package having an opening for allowing an optical signal to pass therethrough;
an optical element located in said package for outputting or inputting the optical signal;
a mount having said optical element placed thereon for fixing said optical element to said package;
a plurality of leads for connecting said optical element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion being downwardly protruded from a plane including a bottom surface of said package; and
a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another,
and wherein each of said leads has an uppermost end which is lower than an uppermost end of said opening, said level difference having a surface which intersects the side surface of said package, and the surface of said level difference being higher than a bottom surface of said mount.

41. A semiconductor element module according to claim 40, further comprising a brazing material disposed within said level difference to secure the attachment of said leads to said package.

42. (Amended) A semiconductor element module, comprising:
a package;
a semiconductor element within said package;

a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion for attachment to a mounting surface, said open end portion being downwardly protruded from a plane including a bottom surface of said package and being shaped to provide a space between the bottom surface of said package and the mounting surface;

a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another; and

a brazing material disposed within said level difference to secure the connection of said leads to said package, to thereby enable said space between the bottom surface of said package and the mounting surface to be no greater than a prescribed amount.

43. A semiconductor element module according to claim 42, wherein said shape comprises an outward bending of the open end portion of the leads to define a mounting plane that is substantially parallel to said bottom surface at said prescribed distance therefrom.

44. A semiconductor element module according to claim 42, wherein said shape comprises a transition in the width of said leads that defines an abutment at said prescribed distance below the bottom surface of said package.

45. (Amended) A semiconductor device comprising a substrate and a semiconductor element module mounted on said substrate, said semiconductor element module including;

a package;

a semiconductor element within said package;

a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion for attachment to a mounting

surface, said open end portion being downwardly protruded from a plane including a bottom surface of said package and being shaped to provide a space between the bottom surface of said package and the mounting surface;

a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another; and

a brazing material disposed within said level difference to secure the connection of said leads to said package, to thereby enable said space between the bottom surface of said package and the mounting surface to be no greater than a prescribed amount.

46. A semiconductor element module according to claim 45, wherein said shape comprises an outward bending of the open end portion of the leads to define a mounting plane that is substantially parallel to said bottom surface at said prescribed distance therefrom.

47. A semiconductor element module according to claim 45, wherein said shape comprises a transition in the width of said leads that defines an abutment at said prescribed distance below the bottom surface of said package.

48. - 50. (Canceled)

51. (Amended) A semiconductor device comprising a substrate and a semiconductor element module mounted on said substrate,
said substrate having a plurality of through-holes and conductor patterns;
said semiconductor element module, including:
a package;
a semiconductor element within said package;
a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion attached to a side surface of said package and another open end portion being downwardly protruded from a

plane including a bottom surface of said package, at least one of said plurality of leads being connected to a high frequency terminal of said semiconductor element module; and

a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another;

and wherein each lead connected to a high frequency terminal is surface-mounted onto said conductor pattern, while each of the remaining leads is inserted into said each of said through-holes.

52. (Amended) A semiconductor element module, comprising:

a package;

a semiconductor element within said package;

a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion of a first width attached along a side surface of said package, an open end portion of a second, narrower width being downwardly protruded from a plane including a bottom surface of said package, and a level difference which defines a transition from said first width to said second width; and

a brazing material located at an edge of said package to secure the attachment of said leads to said package;

wherein said level difference is located lower than said brazing material, and serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another.

53. A semiconductor element module according to claim 52, wherein each of said leads is bent at a point below said level difference.

54. (Amended) A semiconductor device, comprising;

a substrate having a mounting surface on which conductor patterns are formed; and

a semiconductor element module having:

a package;

a semiconductor element within said package;

a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion of a first width attached along a side surface of said package, an open end portion of a second, narrower width being downwardly protruded from a plane including a bottom surface of said package, and a level difference which defines a transition from said first width to said second width, wherein each of said leads is bent at a point below said level difference, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another; and

a brazing material located at an edge of said package to secure the attachment of said leads to said package, wherein said level difference is located lower than said brazing material;

wherein said open end portions of said leads on said semiconductor element module are soldered onto said conductor patterns so that a bottom of said package forms a prescribed space with said mounting surface.

55. (Canceled)

56. (Twice Amended) A semiconductor element module, comprising:

a package;

a semiconductor element within said package;

a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having a wide portion connected to a side surface of said package and a narrow portion that extends downwardly beyond the bottom surface of said package, wherein said wide portion extends below the bottom edge of said side surface, and

a level difference in said side surface of said package adjacent said bottom surface that forms a space between the wide portion of each lead that extends below the bottom edge of said side surface and the bottom of said package, wherein said

level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another.

57. The semiconductor package of claim 56, further including a brazing material disposed within said level difference for securing the connection of said leads to said package.

58. The semiconductor package of claim 55, wherein said narrow portions of said leads are bent outwardly away from said package to form a mounting surface.

59. (Amended) A semiconductor element module, comprising:
a package;
a semiconductor element within said package;
a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion having a tip which is downwardly protruded from a plane including a bottom surface of said package and which is oriented in an outward direction relative to said side surface of said package;
a level difference at said side surface of said package adjacent to said bottom surface of said package so as to form a space between said leads and said package;
wherein said level difference has a first surface which intersects the side surface of said package and which is substantially perpendicular to said side surface and a portion of the leads which protrude downwardly therefrom, and a second surface which intersects said first surface and which is substantially parallel to said side surface, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another;

wherein said semiconductor element module further includes a brazing material that is disposed between said first surface and each of the downwardly

protruding portions of the leads to secure the attachment of said leads to said package; and

wherein said brazing material forms a brazed joint fillet that is displaced from said second surface.

60. (Amended) A semiconductor device comprising a substrate and a semiconductor element module mounted on said substrate, said semiconductor element module including:

a package;

a semiconductor element within said package;

a plurality of leads for connecting said semiconductor element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion having a tip which is downwardly protruded from a plane including a bottom surface of said package and which is oriented in an outward direction relative to said side surface of said package;

a level difference at said side surface of said package adjacent to said bottom surface of said package so as to form a space between said leads and said package;

wherein said level difference has a first surface which intersects the side surface of said package and which is substantially perpendicular to said side surface and a portion of the leads which protrude downwardly therefrom, and a second surface which intersects said first surface and which is substantially parallel to said side surface, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another;

wherein said semiconductor element module further includes a brazing material that is disposed between said first surface and each of the downwardly protruding portions of the leads to secure the attachment of said leads to said package; and

wherein said brazing material forms a brazed joint fillet that is displaced from said second surface.

61. (Amended) A semiconductor element module, comprising;
a package having an opening for allowing an optical signal to pass therethrough;
an optical element located in said package for outputting or inputting the optical signal;
a mount disposed between said optical element and said package;
a plurality of leads for connecting said optical element to an external circuit, said plurality of leads each having one end portion attached along a side surface of said package and another open end portion bent in an outward direction relative to the side surface of said package, said open end portion being downwardly protruded from a plane including a bottom surface of said package; and
a level difference at the side surface of said package adjacent to the bottom surface of said package so as to form a space between said leads and said package, wherein said level difference serves to avoid capillary flow of solder to prevent short circuiting between leads that are adjacent to one another,
each of said leads having an uppermost end which is lower than an uppermost end of said opening, said level difference having a surface which intersects the side surface of said package, and the surface of said level difference being higher than a bottom surface of said mount.

62. A semiconductor element module according to claim 61, further comprising a brazing material disposed within said level difference to secure the attachment of said leads to said package.